What is claimed is:

1. A method of determining a first actual profile associated with a first grating comprising:

receiving a set of measurements associated with a signal indicative of diffraction from the grating;

generating actual spectrum signal data associated with the grating;

selecting a first trial profile;

generating a first trial spectrum signal data associated with the first trial profile;

comparing the first trial spectrum signal data to the first actual spectrum signal data; and

determining parameter values for a second trial profile using at least one optimization technique, wherein the second trial profile is associated with a second sample trial spectrum signal data, and wherein the second trial profile matches the first actual profile more closely than the first trial profile.

2. The method of claim 1, wherein the at least one optimization technique includes at least one member selected from the group consisting of a global optimization technique and a local optimization technique.

3. The method of claim 1, further comprising:

using the at least one optimization technique to generate a plurality of additional trial profiles, each of the plurality of additional trial profiles having an associated additional trial spectrum signal data, wherein each additional trial profile generated matches the actual profile more closely than previously generated additional sample profiles.

4. The method of claim 1, further comprising:

storing the first trial profile, the second trial profile, the first trial spectrum signal data, and the second trial spectrum signal data to a dynamic library of profiles.

5. The method of claim 3, further comprising:

storing the first trial profile, the second trial profile, the additional trial profiles, the first trial parameter set, the second trial spectrum signal data, and the additional trial spectrum signal data to a dynamic library of profiles.

6. The method of claim 5, further comprising:

determining a second actual profile associated with a second grating, including:

receiving a second set of measurements to obtain a second actual spectrum signal data associated with the second grating; and

comparing the second actual spectrum signal data to one or more of the spectrum signal data stored in the dynamic library of profiles.

7. The method of claim 6, wherein the step of determining the second actual profile further comprises:

searching the spectrum signal data stored in the dynamic library of profiles for a match with the second actual spectrum signal data, wherein the match satisfies a preset criteria set, and if a matching spectrum signal data is found,

retrieving a matching profile associated with the matching spectrum signal data.

8. The method of claim 6, wherein the step of determining the second actual profile further comprises:

searching the spectrum signal data stored in the dynamic library of profiles for a match with the second actual spectrum signal data, wherein the match satisfies a preset criteria set, and if no matching spectrum signal data is found,

determining a closest matching spectrum signal data stored in the temporary library of profiles to the second actual spectrum signal data;

retrieving a closest matching profile associated with the closest matching spectrum signal data; and

using at least one of the at least one optimization techniques to iteratively generate additional trial profiles increasingly closer in matching the second actual profile.

9. The method of claim 1, wherein the set of measurements includes at least one member selected from the group consisting of reflectivity and change in polarization states.

10. The method of claim 1, wherein the at least one optimization technique includes a steepest descent technique.

11. A method of setting up a regression optimization, comprising:

receiving a set of measurements;

selecting values for one or more members selected from the group consisting of at least one parameter, at least one range associated with the at least one parameter, and at least one resolution associated with the at least one range;

running the regression optimization and generating regression results associated with the running of the regression optimization;

analyzing the generated regression results; and

using the generated regression results to adjust at least one member selected from the group consisting of the at least one parameter, the at least one range, and the at least one resolution.

12. The method of claim 11, wherein the set of measurements is associated with a grating profile.

13. The method of claim 11, wherein the at least one parameter includes at least one member selected from a top cd, a bottom cd, a sidewall angle, and a thickness.

14. A method of determining a profile associated with a grating, comprising:

receiving a measured signal;

selecting a set of trial parameter values;

determining whether the set of trial parameter values is stored in a database, wherein if the set of trial parameter values is stored in the database,

searching the database for a trial signal associated with the set of trial parameter values,

and wherein if the set of trial parameter values is not stored in the database,

storing the set of trial parameter values in the database,

performing an electromagnetic simulation associated with the set of trial parameter values;

generating a simulated signal, and

storing the simulated signal in the database or another storage medium.

15. The method of claim 14, further comprising:

comparing the simulated signal to the measured signal.

16. The method of claim 14, wherein the set of trial parameter values is associated with a set of one or more trial parameters, wherein the set of one or more trial parameters includes at least one member selected from a top cd, a bottom cd, a sidewall angle, and a thickness.

17. The method of claim 15, wherein the step of comparing includes determining whether the trial signal satisfies a goodness of fit criterion.

18. A method of managing a database, comprising:

selecting or creating a set of one or more parameters, each parameter having a range and a resolution,

storing at least one set of values associated with the one or more parameters to the database;

determining whether all value combinations associated with the set of one or more parameters have been stored into the database; and

if all of the value combinations have been stored into the database, compiling the database into a library.

19. The method of claim 18, wherein if all of the value combinations have not been stored into the database, indicating that the library is not complete.

20. The method of claim 18, further comprising:

indicating that the library is complete.

21. The method of claim 18, further comprising:

clustering the library.

22. A method of determining a profile, comprising:

receiving a set of measurements associated with an actual signal;

searching a profile library for a closest matching set of trial parameter values, wherein the set of trial parameter values is associated with a trial signal;

determining whether the trial signal satisfies a goodness of fit threshold;

and if the trial signal satisfies the threshold, displaying the closest matching set of trial parameter values.

23. The method of claim 22, wherein if the trial signal does not satisfy the threshold, communicating an error message.

24. The method of claim 22, wherein if the trial signal does not satisfy the threshold, changing at least one parameter range associated with at least one of the trial parameter values.

25. The method of claim 22, wherein if the trial signal does not satisfy the threshold, increasing at least one parameter range associated with at least one of the trial parameter values.

26. A method of setting up a regression optimization, comprising:

determining a first set of regression parameters;

receiving a first set of measurements associated with a first profile;

running the regression optimization on the first set of measurements to obtain a first set of resultant parameter values associated with the first profile;

storing the first set of resultant parameter values to a storage location;

receiving a second set of measurements associated with a second profile;

running the regression optimization on the second set of measurements to obtain a second set of resultant parameter values associated with the second profile; and

determining a second set of regression parameters, wherein the second set of regression parameters is associated with at least one member selected from the group consisting of the first set of resultant parameter values and the second set of resultant parameter values.

27. A method of setting up a regression optimization, comprising:

determining a first set of one or more regression parameter ranges;

receiving a first set of measurements associated with a first profile;

running the regression optimization on the first set of measurements to obtain a first set of resultant parameter values associated with the first profile;

storing the first set of resultant parameter values to a storage location;

receiving a second set of measurements associated with a second profile;

running the regression optimization on the second set of measurements to obtain a second set of resultant parameter values associated with the second profile; and

determining a second set of one or more regression parameter ranges, wherein the second set one or more regression parameter ranges is associated with at least one member selected from the group consisting of the first set of resultant parameter values and the second set of resultant parameter values.

28. A computer program product for use in determining a first actual profile associated with a first grating, said computer program product comprising:

a computer usable medium including computer readable program code embodied in said medium for causing determining the first actual profile;

computer readable program code for causing a computer to effect receiving a signal indicative of diffraction from the grating;

computer readable program code for causing said computer to effect generating actual spectrum signal data associated with the grating;

computer readable program code for causing said computer to effect selecting a first trial profile;

computer readable program code for causing said computer to effect generating a first trial spectrum signal data associated with the first trial profile;

computer readable program code for causing said computer to effect comparing the first trial spectrum signal data to the first actual spectrum signal data; and

computer readable program code for causing said computer to effect determining parameter values for a second trial profile using at least one optimization technique, wherein the second trial profile is associated with a second sample trial spectrum signal data, and wherein the second trial profile matches the first actual profile more closely than the first trial profile.

29. An article of manufacture comprising:

a computer usable medium including computer readable program code embodied therein for causing determining a first actual profile associated with a first grating, the computer readable program code in said article of manufacture comprising:

computer readable program code for causing a computer to effect receiving a signal indicative of diffraction from the grating;

computer readable program code for causing said computer to effect generating actual spectrum signal data associated with the grating;

computer readable program code for causing said computer to effect selecting a first trial profile;

computer readable program code for causing said computer to effect generating a first trial spectrum signal data associated with the first trial profile;

computer readable program code for causing said computer to effect comparing the first trial spectrum signal data to the first actual spectrum signal data; and

computer readable program code for causing said computer to effect determining parameter values for a second trial profile using at least one optimization technique, wherein the second trial profile is associated with a second sample trial spectrum signal data, and wherein the second trial profile matches the first actual profile more closely than the first trial profile.

30. The computer program product of claim 28, further comprising:

computer readable program code for causing said computer to effect using the at least one optimization technique to generate a plurality of additional trial profiles, each of the plurality of additional trial profiles having an associated additional trial spectrum signal data, wherein each additional trial profile generated more closely than previously generated additional sample profiles matches the actual profile.

31. The article of manufacture of claim 29, further comprising:

computer readable program code for causing said computer to effect using the at least one optimization technique to generate a plurality of additional trial

profiles, each of the plurality of additional trial profiles having an associated additional trial spectrum signal data, wherein each additional trial profile generated more closely than previously generated additional sample profiles matches the actual profile.

32. The computer program product of claim 28, further comprising:

computer readable program code for causing said computer to effect storing the first trial profile, the second trial profile, the first trial spectrum signal data, and the second trial spectrum signal data to a dynamic library of profiles.

33. The article of manufacture of claim 29, further comprising:

computer readable program code for causing said computer to effect storing the first trial profile, the second trial profile, the first trial spectrum signal data, and the second trial spectrum signal data to a dynamic library of profiles.

34. The computer program product of claim 30, further comprising:

computer readable program code for causing said computer to effect storing the first trial profile, the second trial profile, the additional trial profiles, the first trial parameter set, the second trial spectrum signal data, and the additional trial spectrum signal data to a dynamic library of profiles.

35. The article of manufacture of claim 31, further comprising:

computer readable program code for causing said computer to effect storing the first trial profile, the second trial profile, the additional trial profiles, the first trial parameter set, the second trial spectrum signal data, and the additional trial spectrum signal data to a dynamic library of profiles.

36. The computer program product of claim 34, further comprising:

computer readable program code for causing said computer to effect determining a second actual profile associated with a second grating, including:

computer readable program code for causing said computer to effect receiving a second set of measurements to obtain a second actual spectrum signal data associated with the second grating; and

computer readable program code for causing said computer to effect comparing the second actual spectrum signal data to one or more of the spectrum signal data stored in the dynamic library of profiles.

37. The article of manufacture of claim 35, further comprising:

computer readable program code for causing said computer to effect determining a second actual profile associated with a second grating, including:

computer readable program code for causing said computer to effect receiving a second set of measurements to obtain a second actual spectrum signal data associated with the second grating; and

computer readable program code for causing said computer to effect comparing the second actual spectrum signal data to one or more of the spectrum signal data stored in the dynamic library of profiles.

38. The computer program product of claim 36, wherein the step of determining the second actual profile further comprises:

computer readable program code for causing said computer to effect searching the spectrum signal data stored in the dynamic library of profiles for a match with the second actual spectrum signal data, wherein the match satisfies a preset criteria set, and if a matching spectrum signal data is found,

computer readable program code for causing said computer to effect retrieving a matching profile associated with the matching spectrum signal data.

39. The article of manufacture of claim 37, wherein the step of determining the second actual profile further comprises:

computer readable program code for causing said computer to effect searching the spectrum signal data stored in the dynamic library of profiles for a match with the second actual spectrum signal data, wherein the match satisfies a preset criteria set, and if a matching spectrum signal data is found,

computer readable program code for causing said computer to effect retrieving a matching profile associated with the matching spectrum signal data.

40. The computer program product of claim 36, wherein the step of determining the second actual profile further comprises:

computer readable program code for causing said computer to effect searching the spectrum signal data stored in the dynamic library of profiles for a

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match with the second actual spectrum signal data, wherein the match satisfies a preset criteria set, and if no matching spectrum signal data is found,

computer readable program code for causing said computer to effect determining a closest matching spectrum signal data stored in the temporary library of profiles to the second actual spectrum signal data;

computer readable program code for causing said computer to effect retrieving a closest matching profile associated with the closest matching spectrum signal data; and

computer readable program code for causing said computer to effect using at least one of the at least one optimization techniques to iteratively generate additional trial profiles increasingly closer in matching the second actual profile.

41. The article of manufacture of claim 37, wherein the step of determining the second actual profile further comprises:

computer readable program code for causing said computer to effect searching the spectrum signal data stored in the dynamic library of profiles for a match with the second actual spectrum signal data, wherein the match satisfies a preset criteria set, and if no matching spectrum signal data is found,

computer readable program code for causing said computer to effect determining a closest matching spectrum signal data stored in the temporary library of profiles to the second actual spectrum signal data;

computer readable program code for causing said computer to effect retrieving a closest matching profile associated with the closest matching spectrum signal data; and

computer readable program code for causing said computer to effect using at least one of the at least one optimization techniques to iteratively generate additional trial profiles increasingly closer in matching the second actual profile.

42. The computer program product of claim 28, wherein the set of measurements includes at least one member selected from the group consisting of reflectivity and change in polarization states.

43. the article of manufacture of claim 29, wherein the set of measurements includes at least one member selected from the group consisting of reflectivity and change in polarization states.

44. A computer program product for use in setting up a regression optimization, said computer program product comprising:

a computer usable medium including computer readable program code embodied in said medium for causing setting up the regression optimization;

computer readable program code for causing receiving a set of measurements;

computer readable program code for causing a computer to effect selecting values for one or more members selected from the group consisting of at least one parameter, at least one range associated with the at least one parameter, and at least one resolution associated with the at least one range;

computer readable program code for causing said computer to effect running the regression optimization and generating regression results associated with the running of the regression optimization;

computer readable program code for causing said computer to effect analyzing the generated regression results; and

computer readable program code for causing said computer to effect using the generated regression results to adjust at least one member selected from the group consisting of the at least one parameter, the at least one range, and the at least one resolution.

45. An article of manufacture comprising:

a computer usable medium including computer readable program code embodied therein for causing setting up a regression optimization, the computer readable program code in said article of manufacture comprising:

computer readable program code for causing a computer to effect receiving a set of measurements;

computer readable program code for causing said computer to effect selecting values for one or more members selected from the group consisting of at

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least one parameter, at least one range associated with the at least one parameter, and at least one resolution associated with the at least one range;

computer readable program code for causing said computer to effect running the regression optimization and generating regression results associated with the running of the regression optimization;

computer readable program code for causing said computer to effect analyzing the generated regression results; and

computer readable program code for causing said computer to effect using the generated regression results to adjust at least one member selected from the group consisting of the at least one parameter, the at least one range, and the at least one resolution.

46. The computer program product of claim 44, wherein the set of measurements is associated with a grating profile, and wherein the at least one parameter includes at least one member selected from a top cd, a bottom cd, a sidewall angle, and a thickness.

47. The article of manufacture of claim 45, wherein the set of measurements is associated with a grating profile, and wherein the at least one parameter includes at least one member selected from a top cd, a bottom cd, a sidewall angle, and a thickness.

48. A computer program product for use in determining a profile associated with a grating, said computer program product comprising:

a computer usable medium including computer readable program code embodied in said medium for causing determining the profile;

computer readable program code for causing a computer to effect receiving a measured signal;

computer readable program code for causing said computer to effect selecting a set of trial parameter values;

computer readable program code for causing said computer to effect determining whether the set of trial parameter values is stored in a database, wherein if the set of trial parameter values is stored in the database,

computer readable program code for causing said computer to effect searching the database for a trial signal associated with the set of trial parameter values,

and wherein if the set of trial parameter values is not stored in the database,

computer readable program code for causing said computer to effect storing the set of trial parameter values in the database;

computer readable program code for causing said computer to effect performing an electromagnetic simulation associated with the set of trial parameter values;

computer readable program code for causing said computer to effect generating a simulated signal; and

computer readable program code for causing a computer to effect storing the simulated signal in the database or another storage medium.

49. An article of manufacture comprising:

a computer usable medium including computer readable program code embodied therein for causing determining a profile associated with a grating, the computer readable program code in said article of manufacture comprising:

computer readable program code for causing a computer to effect receiving a measured signal;

computer readable program code for causing said computer to effect selecting a set of trial parameter values;

computer readable program code for causing said computer to effect determining whether the set of trial parameter values is stored in a database, wherein if the set of trial parameter values is stored in the database,

computer readable program code for causing said computer to effect searching the database for a trial signal associated with the set of trial parameter values,

and wherein if the set of trial parameter values is not stored in the database,

computer readable program code for causing said computer to effect storing the set of trial parameter values in the database;

computer readable program code for causing said computer to effect performing an electromagnetic simulation associated with the set of trial parameter values;

computer readable program code for causing said computer to effect generating a simulated signal; and

computer readable program code for causing said computer to effect storing the simulated signal in the database or another storage medium.

50. The computer program product of claim 48, further comprising:

computer readable program code for causing said computer to effect comparing the trial signal to the measured signal, wherein the step of comparing includes:

computer readable program code for causing said computer to effect determining whether the trial signal satisfies a goodness of fit criterion.

51. The article of manufacture of claim 49, further comprising:

computer readable program code for causing said computer to effect comparing the trial signal to the measured signal, wherein the step of comparing includes:

computer readable program code for causing said computer to effect determining whether the trial signal satisfies a goodness of fit criterion.

52. A computer program product for use in managing a database, said computer program product comprising:

a computer usable medium including computer readable program code embodied in said medium for causing managing the database;

computer readable program code for causing a computer to effect selecting or creating a set of one or more parameters, each parameter having a range and a resolution;

computer readable program code for causing said computer to effect storing at least one set of values associated with the one or more parameters to the database;

computer readable program code for causing said computer to effect determining whether all value combinations associated with the set of one or more parameters have been stored into the database, and if all of the value combinations have been stored into the database,

     computer readable program code for causing said computer to effect compiling the database into a library.

53. An article of manufacture comprising:

a computer usable medium including computer readable program code embodied therein for causing managing a database, the computer readable program code in said article of manufacture comprising:

computer readable program code for causing a computer to effect selecting or creating a set of one or more parameters, each parameter having a range and a resolution;

computer readable program code for causing said computer to effect storing at least one set of values associated with the one or more parameters to the database;

computer readable program code for causing said computer to effect determining whether all value combinations associated with the set of one or more parameters have been stored into the database, and if all of the value combinations have been stored into the database,

    computer readable program code for causing said computer to effect compiling the database into a library.

54. The computer program product of claim 52, wherein if all of the value combinations have not been stored into the database,

     computer readable program code for causing said computer to effect indicating that the library is not complete.

55. The article of manufacture of claim 53, wherein if all of the value combinations have not been stored into the database,

computer readable program code for causing said computer to effect indicating that the library is not complete.

56. The computer program product of claim 52, further comprising:

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computer readable program code for causing said computer to effect indicating that the library is complete; and

computer readable program code for causing said computer to effect clustering the library.

57. The article of manufacture of claim 53, further comprising:

computer readable program code for causing said computer to effect indicating that the library is complete; and

computer readable program code for causing said computer to effect clustering the library.

58. A computer program product for use in determining a profile, said computer program product comprising:

a computer usable medium including computer readable program code embodied in said medium for causing determining the profile;

computer readable program code for causing a computer to effect receiving a set of measurements associated with an actual signal;

computer readable program code for causing said computer to effect searching a profile library for a closest matching set of trial parameter values, wherein the set of trial parameter values is associated with a trial signal;

computer readable program code for causing said computer to effect determining whether the trial signal satisfies a goodness of fit threshold, and if the trial signal satisfies the threshold:

computer readable program code for causing said computer to effect displaying the closest matching set of trial parameter values.

59. An article of manufacture comprising:

a computer usable medium including computer readable program code embodied therein for causing determining a profile, the computer readable program code in said article of manufacture comprising:

computer readable program code for causing a computer to effect receiving a set of measurements associated with an actual signal;

computer readable program code for causing said computer to effect searching a profile library for a closest matching set of trial parameter values, wherein the set of trial parameter values is associated with a trial signal;

computer readable program code for causing said computer to effect determining whether the trial signal satisfies a goodness of fit threshold, and if the trial signal satisfies the threshold:

computer readable program code for causing said computer to effect displaying the closest matching set of trial parameter values.

60. The computer program product of claim 58, wherein if the trial signal does not satisfy the threshold,

computer readable program code for causing said computer to effect communicating an error message.

61. The article of manufacture of claim 59, wherein if the trial signal does not satisfy the threshold,

computer readable program code for causing said computer to effect communicating an error message.

62. The computer program product of claim 58, wherein if the trial signal does not satisfy the threshold,

computer readable program code for causing said computer to effect changing at least one parameter range associated with at least one of the trial parameter values.

63. The article of manufacture of claim 59, wherein if the trial signal does not satisfy the threshold,

computer readable program code for causing said computer to effect changing at least one parameter range associated with at least one of the trial parameter values.

64. The computer program product of claim 58, wherein if the trial signal does not satisfy the threshold,

computer readable program code for causing said computer to effect increasing at least one parameter range associated with at least one of the trial parameter values.

65. The article of manufacture of claim 59, wherein if the trial signal does not satisfy the threshold,

computer readable program code for causing said computer to effect increasing at least one parameter range associated with at least one of the trial parameter values.

66. A computer program product for use in setting up a regression optimization, said computer program product comprising:

a computer usable medium including computer readable program code embodied in said medium for setting up the regression optimization;

computer readable program code for causing a computer to effect determining a first set of regression parameters;

computer readable program code for causing said computer to effect receiving a first set of measurements associated with a first profile;

computer readable program code for causing said computer to effect running the regression optimization on the first set of measurements to obtain a first set of resultant parameter values associated with the first profile;

computer readable program code for causing said computer to effect storing the first set of resultant parameter values to a storage location;

computer readable program code for causing said computer to effect receiving a second set of measurements associated with a second profile;

computer readable program code for causing said computer to effect running the regression optimization on the second set of measurements to obtain a second set of resultant parameter values associated with the second profile; and

computer readable program code for causing said computer to effect determining a second set of regression parameters, wherein the second set of regression parameters is associated with at least one member selected from the group consisting of the first set of resultant parameter values and the second set of resultant parameter values.

67. An article of manufacture comprising:

a computer usable medium including computer readable program code embodied therein for causing setting up a regression optimization, the computer readable program code in said article of manufacture comprising:

computer readable program code for causing a computer to effect determining a first set of regression parameters;

computer readable program code for causing said computer to effect receiving a first set of measurements associated with a first profile;

computer readable program code for causing said computer to effect running the regression optimization on the first set of measurements to obtain a first set of resultant parameter values associated with the first profile;

computer readable program code for causing said computer to effect storing the first set of resultant parameter values to a storage location;

computer readable program code for causing said computer to effect receiving a second set of measurements associated with a second profile;

computer readable program code for causing said computer to effect running the regression optimization on the second set of measurements to obtain a second set of resultant parameter values associated with the second profile; and

computer readable program code for causing said computer to effect determining a second set of regression parameters, wherein the second set of regression parameters is associated with at least one member selected from the group consisting of the first set of resultant parameter values and the second set of resultant parameter values.

68. A computer program product for use in setting up a regression optimization, said computer program product comprising:

a computer usable medium including computer readable program code embodied in said medium for setting up the regression optimization;

computer readable program code for causing a computer to effect determining a first set of one or more regression parameter ranges;

computer readable program code for causing said computer to effect receiving a first set of measurements associated with a first profile;

computer readable program code for causing said computer to effect running the regression optimization on the first set of measurements to obtain a first set of resultant parameter values associated with the first profile;

computer readable program code for causing said computer to effect storing the first set of resultant parameter values to a storage location;

computer readable program code for causing said computer to effect receiving a second set of measurements associated with a second profile;

computer readable program code for causing said computer to effect running the regression optimization on the second set of measurements to obtain a second set of resultant parameter values associated with the second profile; and

computer readable program code for causing said computer to effect determining a second set of one or more regression parameter ranges, wherein the second set one or more regression parameter ranges is associated with at least one member selected from the group consisting of the first set of resultant parameter values and the second set of resultant parameter values.

69. An article of manufacture comprising:

a computer usable medium including computer readable program code embodied therein for causing setting up a regression optimization, the computer readable program code in said article of manufacture comprising:

computer readable program code for causing a computer to effect determining a first set of one or more regression parameter ranges;

computer readable program code for causing said computer to effect receiving a first set of measurements associated with a first profile;

computer readable program code for causing said computer to effect running the regression optimization on the first set of measurements to obtain a first set of resultant parameter values associated with the first profile;

computer readable program code for causing said computer to effect storing the first set of resultant parameter values to a storage location;

computer readable program code for causing said computer to effect receiving a second set of measurements associated with a second profile;

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computer readable program code for causing said computer to effect running the regression optimization on the second set of measurements to obtain a second set of resultant parameter values associated with the second profile; and

computer readable program code for causing said computer to effect determining a second set of one or more regression parameter ranges, wherein the second set one or more regression parameter ranges is associated with at least one member selected from the group consisting of the first set of resultant parameter values and the second set of resultant parameter values.

70. A system for determining a first actual profile associated with a first grating comprising:

means for receiving a set of measurements associated with a signal indicative of diffraction from the grating;

means for generating actual spectrum signal data associated with the grating;

means for selecting a first trial profile;

means for generating a first trial spectrum signal data associated with the first trial profile;

means for comparing the first trial spectrum signal data to the first actual spectrum signal data; and

means for determining parameter values for a second trial profile using at least one optimization technique, wherein the second trial profile is associated with a second sample trial spectrum signal data, and wherein the second trial profile matches the first actual profile more closely than the first trial profile.